out for the curve **3** with using the magnetization M as a parameter, such that the curve **3** is fitted along a serried of measurement data which are successively acquired from the geomagnetic sensor during the course of the opening operation of the portable terminal **1**, thereby obtaining the magnetization M.

Next, based on the obtained magnetization M, computation is carried out to calculate a value of the magnetic field under the closed state of the portable terminal **1**, and another value of the magnetic field under the open state of the portable terminal **1**. The magnetic field from the permanent magnet varies while the portable terminal **1** changes from the closed state to the completely open state. This variation of the magnetic field is represented by the curve **2** with the obtained magnetization M. Here, the opposite end points of the curve **2** correspond to the magnetic field from the magnet observed under the completely open state of the portable terminal **1**, the magnetic field from the magnet observed under the closed state of the portable terminal **1**. Therefore, the values of the magnetic field at the opposite end point of the curve **2** with the obtained magnetization M are calculated to obtain the value of magnetic field under the closed state of the portable terminal **1**, and the value of the magnetic field under the completely open state of the portable terminal **1**.

Further, a difference is calculated between the value of the magnetic field under the closed state of the portable terminal **1**, and the value of the magnetic field under the completely open state of the portable terminal **1**. This difference value corresponds to a value of the magnetic field influenced to the geomagnetic sensor from the magnet having the magnetization M.

Lastly, the calculated difference is subtracted from the offset value which is previously estimated under the closed state of the portable terminal **1**, thereby compensating for the leakage magnetic field and formally updating the offset.

As described above, when the calibration of the magnetic sensor is implemented in the state where the portable terminal **1** is closed, and then the user opens the portable terminal **1**, the leakage magnetic field correction of the offset is further implemented so that more accurate calibration is realized without forcing the user to carry out a particular operation.

In the foregoing, the main control section **108** of the portable terminal **1** performs the processing for the estimation of the offset and the leakage magnetic field correction. However, it may be configured that a processing section for implementing such processing is provided in a sensor data acquisition section (magnetic sensor device) **115**, a close signal indicating that the portable terminal **1** has been closed is fed to the sensor data acquisition section **115** from the main control section **108** and, in response thereto, the sensor data acquisition section **115** performs the foregoing offset estimation processing, while, an open signal indicating that the portable terminal **1** has been opened is fed to the sensor data acquisition section **115** from the main control section **108** and, in response thereto, the sensor data acquisition section **115** performs the foregoing leakage magnetic field correction processing.

The invention claimed is:

1. A method of measuring a magnetic offset of a geomagnetic sensor equipped in a portable information terminal apparatus, the geomagnetic sensor having a magnetic sensitivity to a geomagnetic field in a plurality of axes of a coordinate system, and being affected by magnetization to cause the magnetic offset, the method comprising:

a data measurement step of measuring an output of the geomagnetic sensor and acquiring a plurality of measurement data of the geomagnetic field, each measurement data being represented by a data point in the coordinate system;

an offset estimation step of estimating an offset value of the magnetic offset of the geomagnetic sensor from the plurality of the measurement data of the geomagnetic field, the offset value being represented by an offset point in the coordinate system;

a mean value calculation step of calculating distances between the offset point corresponding to the offset value and a plurality of the data points corresponding to the plurality of the measurement data used for estimating of the offset value, and further calculating a mean value of the calculated distances between the offset point and the plurality of the data points;

a standard deviation calculation step of calculating a standard deviation of the calculated distances with respect to the calculated mean value of the distances; and

a validity judgment step of judging validity of the estimated offset value on the basis of the calculated standard deviation.

2. The method according to claim **1**, wherein the portable information terminal apparatus has a first storage and a second storage, and the data measurement step successively acquires the measurement data from the geomagnetic sensor, the method further comprising:

a data storing step of storing the measurement data successively acquired by the data measurement step into the first storage, so that the offset estimation step reads out the plurality of the measurement data from the first storage and estimates the offset value of the magnetic offset from the plurality of the measurement data read out from the first storage; and

an offset storing step of storing the estimated offset data in the second storage when the validity of the estimated offset value is confirmed by the validity judgment step.

3. The method according to claim **1**, wherein the portable information terminal apparatus has a first storage for storing the measurement data and a second storage for storing the offset value, and the data measurement step successively acquires the measurement data including previous measurement data and current measurement data, the method further comprising:

a distance calculation step of calculating a distance between a current data point corresponding to the current measurement data and a previous data point corresponding to the previous measurement data which has been stored in the first storage;

a determining step of determining whether the calculated distance between the current data point and the previous data point is greater than a predetermined distance;

a data storing step of storing the current measurement data in the first storage when the calculated distance is determined greater than the predetermined distance, thereby accumulating the measurement data in the first storage by repeating a routine of the distance calculation step, the determining step and the data storing step, so that the offset estimation step reads out the plurality of the measurement data from the first storage when a number of the measurement data stored in the first storage reaches a predetermined number and estimates the offset value of the magnetic offset from the plurality of the measurement data read out from the first storage; and